We Claim:

1. A method of data communication between an implanted device and an external device comprising

providing an implanted device having a first antenna and first circuit components operatively associated therewith,

providing an external device having a second antenna and an associated microprocessor,

positioning said first antenna and said second antenna with living biological tissue therebetween, and

effecting communication between said implanted device and said external device to establish current pulses in at least one direction between said first antenna electrode and said second antenna electrode.

2. The method of claim 1, including

implanting said implanted device in a living patient.

3. The method of claim 2, including

implanting said implanted device in a human being.

4. The method of claim 3, including

effecting said communication both from said first antenna to second antenna and from said second antenna to said first antenna.

5. The method of claim 4, including

effecting said communication in a synchronous manner.

6. The method of claim 5, including

employing heart pulses of said human being as a clock in synchronizing said communications.

7. The method of claim 4, including

providing a microprocessor as one of said first circuit components.

8. The method of claim 7, including

providing at least one sensor as one of said first circuit components.

9. The method of claim 8, including

implanting said implanted device in the brain of said human being.

10. The method of claim 4, including

implanting said implantable device in the abdomen of said human being.

11. The method of claim 9, including

employing said method to monitor brain functioning.

12. The method of claim 10, including

employing said method to communicate subdural electroencephologographic signals to said external device.

13. The method of claim 1, including

establishing the distance between said first antenna and said second antenna at less than about 15 cm.

14. The method of claim 1, including

employing in said first antenna a pair of electrically conductive concave shells having their concave surfaces facing in generally opposed directions from each other.

15. The method of claim 14, including

said electrically conductive concave shells having generally concave surfaces facing each other, and

electrically insulating the convex surfaces of said electrically conductive shells of said first antenna from each other.

16. The method of claim 4, including

placing the electrodes of said second antenna in contact with the skin of said human being.

17. The method of claim 1, including

employing said method for diagnostic purposes.

18. The method of claim 1, including

employing said method for therapeutic purposes.

19. The method of claim 1, including

providing a power source as a said first circuit component in said implanted device.

20. The method of claim 1, including

providing said first circuit components on an electronic chip.

21. The method of claim 20, including

providing said implanted first antenna on said electronic chip.

22. The method of claim 1, including

protectively encapsulating said implanted device with a resinous material.

23. The method of claim 1, including

directing the current pulses from said implanted first antenna through said biological material to said external second antenna.

24. The method of claim 20, including

providing an electrically nonconductive flexible sheet to reflect brain current flux and resist said fluid contacting said first antenna.

25. The method of claim 1, including

employing said first antenna and said second antenna for both transmission and reception of said current pulses.

26. The method of claim 1, including

said implantable device having a width of less than about 12 mm, a length of less than about 12 mm and a thickness of less than about 4 mm.

27. The method of claim 8, including

employing said external device to transmit a current pulse to cause said internal device to transmit data,

said internal device responsively transmitting said data to said external device, and

said transmissions being effected at times other than the period of R-waves of an electrocardiogram.

28. The method of claim 27 including

said external device emitting a current pulse or pulses of the different sign or configuration from the pulses it emits when it requests data from said implanted device when it wishes to transmit data to said implanted device, and

said external device following said pulses with the desired transmitted data to said implanted device with said pulses being transmitted at a time other than the time period when R-waves of the electrocardiogram are present.

29. The method of claim 21, including

positioning said first antenna up to about 15 cm from said second antenna electrode.

30. The method of claim 14, including

said shells being asymmetrical.

31. Apparatus for volume conduction between an implantable device and an external device, comprising

an implantable device having a first antenna and first circuit components for transmitting current pulses through living biological tissue and receiving current pulses therethrough,

a second antenna for transmitting current pulses through living biological tissue and receiving current therethrough,

said first circuit components including a first microprocessor,

said external device having a second microprocessor,

said first antenna being a directional antenna, and

said apparatus being structured for directional data communication.

32. The apparatus of claim 31, including

employing in said first antenna electrodes having a pair of electrically conductive concave shells facing in generally opposed directions from each other, and

said second antenna for contacting the skin generally adjacent said biological tissue.

33. The apparatus of claim 32, including

said antenna electrodes being asymmetrical.

34. The apparatus of claim 31, including

said first circuit components including at least one sensor.

35. The apparatus of claim 34, including

said implantable device structured to deliver EEG data to said external device.

36. The apparatus of claim 35, including

said antenna electrode shells having convex surfaces generally facing each other, and

electrical insulation disposed on said convex surfaces.

37. The apparatus of claim 35, including

said first circuit components including at least one power source.

38. The apparatus of claim 31, including

said implantable device being configured and dimensioned to be implantable in a human abdomen.

39. The apparatus of claim 38, including

said implantable device having a width less than about 12 mm, a length less than about 12, and a thickness less than about 4 mm.

40. The apparatus of claim 37, including

an electrically nonconductive flexible sheet for reflecting brain current flux away from said first antenna disposed on the opposite side of said first antenna electrode from said second antenna.

41. An antenna for transmitting current through biological tissue comprising

a pair of electrically conductive concave shells facing in opposed directions from each other.

42. The apparatus of claim 41, including

said concave shells having convex surfaces generally facing each other, and

electrically insulative material disposed on said convex surfaces.

43. The apparatus of claim 42, including

said antenna electrodes being asymmetrical.

44. The apparatus of claim 41, including

said antennas having a maximum thickness of less than about 4 mm.

45. The apparatus of claim 43, including

said antenna having an upper portion that is longer than the lower portion measured along the electrode.

46. The apparatus of claim 41, including

said concave shells having a generally circular configuration as viewed in end elevations.

47. The apparatus of claim 46, including

said antenna electrodes being generally symmetrical.

48. The apparatus of claim 41, including

said concave shells having a generally rectangular configuration as viewed in end elevation.